Capacity increased, time cut with change to 15 hp mill

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New Solutions to Plant Problems

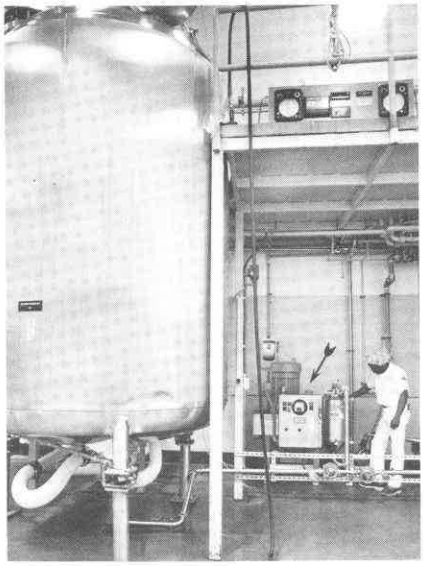
Marion Laboratories, Inc., headquartered in Kansas City, MO, researches, develops and manufactures pharmaceutical and health care products.

One of the products is a topical ointment for heart patients. This ointment is applied directly to the skin above the heart area, and the active ingredient is slowly absorbed over a long time. This permits the patient to engage in semi-strenuous activity for prolonged periods.

However, Marion Laboratories' production line for this ointment was not meeting the demand for the product. Investigation of the line revealed a bottleneck in the dispersion phase which employed a 35 hp three roll mill. The mill's maximum capacity of the ointment — 13.2 lb/min — was insufficient to meet the demand and was creating a time lag in the production line.

One of the proposed solutions was a larger three roll mill, but that meant more horsepower, which meant more energy consumption. Also investigated was a homogenizer, but the high price tag led Marion Laboratories' production team to look further.

Tests were then conducted using a mill with a 15 hp motor. Trials showed that the 15 hp mill had a larger production capacity: 46.2 lb of ointment per minute as opposed to the 13.2 lb/min with the three roll mill. The 15 hp mill also cut the production time of the ointment from six hours to two hours.



On the production line for Marion Laboratories' suspension for oral consumption, 2500 gal tanks heat and mix the formula prior to being gravity-fed to the 15 hp mill (see arrow) for dispersion

The 15 hp mill (see arrow) disperses the ointment at Marion Laboratories' Kansas City, MO plant.

After a long shelf life, the ointment processed using the 15 hp mill showed no signs of deterioration and experienced no phase separation. The unit cut air exposure time, thereby reducing chances of microbial contamination, and the ease of cleaning the mill decreased cleaning time by half.

The 15 hp mill starts up and continues in an uninterrupted manner in a one-pass operation. On the other hand, the three roll mill required a minimum of 20 minutes startup time and required frequent adjustments.

Marion Laboratories' new production line for their topical ointment is:

1. Stainless steel, 650 gal kettles with side-scraping agitators are mounted on load cells that provide automatic readout of the weight. This permits workers to check the weight against the formula. The kettles are covered with fiberglass insulation and enclosed in an outer stainless steel case. The agitators are powered by 7½ hp, variable-speed motors.
2. A standard ointment base is prepared, and the active ingredient is added.
3. This mixture is pumped to the 15 hp

(over)

mill for dispersion and the ointment is discharged.

4. The ointment is pumped to holding tanks and finally to packaging.

While the method using the 15 hp mill has proven a success for Marion Laboratories' capacity problem, additional benefits were noticed after the line was running.

The 15 hp mill produces a smoother ointment; grittiness has been alleviated. Also, quality control is no longer a problem because the mill produces a consistently high-quality product.

As it turned out, Marion Laboratories purchased a second unit to replace a colloid mill that was used on a production line for another of their products, a suspension for oral consumption. This production line now consists of the following steps:

1. The vehicle, suspending agents and active ingredients are added and mixed well in a large liquid compounding tank.
2. The mixture is gravity fed to the mill for dispersion, and the suspension is pumped to holding tanks.
3. The suspension for oral consumption is then packaged.

Marion Laboratories' purchase of the second mill provided the same benefits derived from the mill for the ointment and cut production time of the suspension in half.

Future research at the company will include not only new products, but new ways to use the 15 hp mill in existing and future production lines.

Comitrol® Processor Model 1700
By Urschel Laboratories